

[0045] over the rear face of the phosphor layer 16, a relatively thin optically-reflective electrically-insulating layer (19) of a relatively high dielectric constant material (in the Figure this layer is shown as a seamless extension of the phosphor layer 16); and

[0046] disposed over the rear face of the reflective electrically-insulating layer 19, an electrically-conductive film (20) forming the rear electrode(s) of the display.

[0047] The front and rear electrodes together define which areas of both the liquid crystal layer and the electroluminescent layer can be selected to be switched “on” or “off”.

[0048] In addition, the back electrode layer may be covered with a protective film (not shown here). Again, this may be omitted when combined within a HID.

[0049] In an alternative embodiment shown in FIG. 5 of the accompanying drawings, the EL and LC materials are not directly formed on one another, 10 but are instead separated by an insulating interlayer. In all other aspects, FIGS. 4 and 5 are the same and common reference numerals have been used.

[0050] In either case with or without the interlayer 10, the EL and LC materials can share the common pair of electrodes 12, 20 for common activation of the EL and LC materials. Thus, a common front electrode 12 and substrate can support multiple indicia 21a, 21b. Each indicium 21a, 21b comprises the remaining layers of the structure shown in FIG. 4 or FIG. 5 of the accompanying drawings, namely the LC layer 13, optionally the interlayer 10, the EL layer 17, the reflective insulating layer 18 and the rear electrode 20. These layers are shaped to provide selectively illuminatable elements that can be illuminated to provide indications to a user; in the present example these are the numbers “5” and “6” but could be extended to any indicia.

[0051] Underneath the display layer 106 there is provided a plurality of domes, e.g. 114, 116. For the sake of clarity on two such domes are shown but there would generally be more. Such domes 114, 116 are exemplified by U.S. Pat. No. 6,844, 508.

[0052] For example, to provide a typical numeric keypad requires roughly between 9 and 12 buttons. As such, there may be provided substantially 9 to 12 buttons. If the HID provides more than a numeric keypad then there might be further buttons provided. For example there may be roughly any of the following number of buttons: 15, 20, 25, 30, 35, 40.

[0053] Each dome 114, 116 corresponds to the location of a switch/button provided by the HID. As can be seen in FIG. 1 the location of each dome 114, 116 corresponds with the location of the raised portions 102, 104 in the key cap layer 100. That is the dome 114 is substantially directly underneath the raised portion 104 and the dome 116 is substantially directly underneath the raised portion 102.

[0054] Thus, the raised portions 102, 104 provide tactile feedback to a user of the HID as to the location of a button. The skilled person will appreciate that an advantage of such domes 114, 116 is that they provide tactile feedback that a button has been pressed; the user is given a direct feel that an activation has been made.

[0055] Typically, the domes are fabricated from a metal but other conducting materials are suitable. It would also be possible to fabricate the domes from a plastics material and cover them in a conductor such as metal.

[0056] In some embodiments, there is provided underneath the domes a circuit layer 118 which contains a plurality of tracks each having at least one break therein. The domes 114,

116 positioned thereabove are arranged, upon user activation, to complete the track by bridging the gap therein.

[0057] FIG. 2 shows a possible layout of the tracks in the circuit layer 118.

[0058] The track are presented as a grid, with a portion 200 thereof running in a horizontal direction as shown in the figure and a further portion 202 running in a vertical direction as shown in the figure. The horizontal portion 200 of the track is connected to an outer ring 204 of a contact area 206 and the vertical portion 202 of the track is connected to an inner region 208 of the contact area 206. A gap 210, which provides a break, exists between the outer ring 204 and the inner region 208 such that a gap exists between the portions of the tracks 200 and 202; i.e. there is a break in the tracks 200, 202.

[0059] A dome 114, 116 is positioned above a contact area 206 such that the outer circumferential region of the dome rests on the outer ring 204 of the contact area 206. When a user activates a dome 114, 116 it collapses and a central region thereof comes into contact with the inner region 208 of the contact area 206 thereby bridging the horizontal portion 200 and the vertical portion 202 of the tracks.

[0060] In use, a device, such as a cell phone 300, can accept inputs from the capacitive sensing layer 106 as a user touches the screen in that area. Should the embodiment be provided with a circuit layer 118 then the cell phone 300 may also take inputs from the circuit layer 118 as the user collapses the dome 114, 116 to complete the circuit in the circuit layer 118.

[0061] An advantage of a HID having the capacitive layer is that it can function as mouse pad (sometimes called a track pad, etc.) in which a users input is tracked as he/she moves his/her finger around the HID. The presence of the metal domes 114, 116 give positive confirmation that a press has been made which is generally confirmed by completing the circuit in the circuit layer 118.

[0062] However, it is possible for the cell phone 300 to modify the behaviour of a button provided by a dome 114, 116 depending on user actions. For example, if a user were to hover his/her finger over a button for more than a predetermined time then the functionality of the button may change. For example, the predetermined time may be substantially any of the following: 0.5s, 1s, 2s, 3s, 4s or the like.

[0063] The direction of motion of a user's finger(s), as sensed by the capacitive sensing layer 106 prior to a press may alter the functionality of a button provided by a dome 114, 116. For example, if a user moved his/her finger from left to right before pressing a button that button may have a different functionality compared to a user moving his/her finger from right to left before pressing that same button.

[0064] Additionally, or alternatively, gestures may alter the functionality of a button. For example if a user made a pinching gesture with his/her fingers then the functionality of a button may be modified.

[0065] Further, the number of fingers that a user uses on the HID may affect the functionality of a button.

1-12. (canceled)

13. A human interface device comprising:

a capacitive sensing layer arranged to provide at least one coordinate location where a user touches the human interface device;

a circuit layer including a plurality of tracks, each of the plurality of tracks including at least one break; and

a plurality of user-activatable domes, each of the plurality of user-activatable domes being positioned above a corresponding one of the at least one break; wherein